Complete Summary

GUIDELINE TITLE

ACC/AHA/ESC 2006 guidelines for the management of patients with atrial fibrillation. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation).

BIBLIOGRAPHIC SOURCE(S)

European Heart Rhythm Association, Heart Rhythm Society, Zipes DP, Camm AJ, Borggrefe M, Buxton AE, Chaitman B, Fromer M, Gregoratos G, Klein G, Moss AJ, Myerburg RJ, Priori SG, Quinones MA, Roden DM, Silka MJ, Tracy C, Smith SC Jr, Jacobs AK, Adams CD, Antman EM, Anderson JL, Hunt SA, Halperin JL, Nishimura R, Ornato JP, Page RL, Riegel B, Priori SG, Blanc JJ, Budaj A, Camm AJ, Dean V, Deckers JW, Despres C, Dickstein K, Lekakis J, McGregor K, Metra M, Morais J, Osterspey A, Tamargo JL, Zamorano JL, American College of Cardiology, American Heart Association Task Force, European Society of Cardiology Committee for Practice Guidelines. ACC/AHA/ESC 2006 guidelines for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: a report of the American College of Cardiology/American Heart Association Task Force and the European Society [trunc]. J Am Coll Cardiol 2006 Sep 5;48(5):e247-346. [1085 references] PubMed

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American College of Cardiology, American Heart Association, European Society of Cardiology. ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation. J Am Coll Cardiol 2001 Oct;38:1266i-lxx.

Fuster V, Ryden LE, Asinger RW, Cannom DS, Crijns HJ, Frye RL, Halperin JL, Kay GN, Klein WW, Levy S, McNamara RL, Prystowsky EN, Wann LS, Wyse DG. ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the ESC Committee for Practice Guidelines and Policy [trunc]. Eur Heart J 2001 Oct;22(20):1852-923.

**** REGULATORY ALERT ****

FDA WARNING/REGULATORY ALERT

Note from the National Guideline Clearinghouse: This guideline references a drug(s) for which important revised regulatory and/or warning information has been released.

- February 28, 2008, Heparin Sodium Injection: The U.S. Food and Drug Administration (FDA) informed the public that Baxter Healthcare Corporation has voluntarily recalled all of their multi-dose and single-use vials of heparin sodium for injection and their heparin lock flush solutions. Alternate heparin manufacturers are expected to be able to increase heparin production sufficiently to supply the U.S. market. There have been reports of serious adverse events including allergic or hypersensitivity-type reactions, with symptoms of oral swelling, nausea, vomiting, sweating, shortness of breath, and cases of severe hypotension.
- August 16, 2007, Coumadin (Warfarin): Updates to the labeling for Coumadin to include pharmacogenomics information to explain that people's genetic makeup may influence how they respond to the drug.

COMPLETE SUMMARY CONTENT

SCOPE

DISEASE/CONDITION(S)

Atrial fibrillation

GUIDELINE CATEGORY

Evaluation
Management
Treatment

CLINICAL SPECIALTY

Cardiology
Emergency Medicine
Family Practice
Internal Medicine

INTENDED USERS

Physicians

GUIDELINE OBJECTIVE(S)

- To update and combine the previously published recommendations into one source approved by the major cardiology organizations in the United States and Europe
- To produce guidelines that improve the effectiveness of care, optimize patient outcomes, and affect the overall cost of care favorably by focusing resources on the most effective strategies
- To present a comprehensive review of the latest information about the definition, classification, epidemiology, mechanisms, and clinical characteristics of atrial fibrillation
- To review the management of this complex and potentially dangerous arrhythmia

TARGET POPULATION

Patients with atrial fibrillation

INTERVENTIONS AND PRACTICES CONSIDERED

Clinical Evaluation

1. History and physical examination
2. Electrocardiogram
3. Transthoracic echocardiography
4. Blood tests including thyroid, renal, and hepatic function
5. Additional tests, as needed, including
    - Six-minute walk test
    - Exercise testing
    - Holter monitoring
    - Transesophageal echocardiography (TEE)
    - Electrophysiological study
    - Chest radiography

Management

1. Rate control
    - Pharmacological control, using calcium channel blockers (diltiazem and verapamil), beta-blockers (esmolol, metoprolol, propranolol), digoxin, amiodarone
    - Atrioventricular nodal ablation
2. Prevention of thromboembolism
    - Risk stratification
    - Anticoagulants (Vitamin K antagonists, aspirin, unfractionated heparin, low molecular weight heparin)
3. Cardioversion
    - Pharmacological cardioversion

    - Direct-current (DC) cardioversion including pharmacological enhancement and prevention of thromboembolism
4. Maintenance of sinus rhythm after cardioversion
    - Treatment of precipitating or reversible causes of atrial fibrillation
    - Pharmacological therapy, including propafenone, flecainide, or sotalol
    - Catheter ablation
5. Consideration of special circumstances, including
    - Postoperative atrial fibrillation
    - Acute myocardial infarction
    - Wolff-Parkinson White preexcitation syndromes
    - Hyperthyroidism
    - Pregnancy
    - Hypertrophic cardiomyopathy
    - Pulmonary diseases

MAJOR OUTCOMES CONSIDERED

- Heart rate (ventricular) control
- Restoration and maintenance of sinus rhythm
- Hemodynamic function
- Arrhythmia-free survival rate
- Recurrence of atrial fibrillation (AF)
- Rate of thromboembolism
- Rate of ischemic stroke
- Adverse effects of treatment (e.g., hemorrhagic complications, arrhythmias)
- Quality of life
- Cost of care, cost savings
- Mortality rate

METHODOLOGY

METHODS USED TO COLLECT/SELECT EVIDENCE

Searches of Electronic Databases

DESCRIPTION OF METHODS USED TO COLLECT/SELECT THE EVIDENCE

The American College of Cardiology/American Heart Association/European Society of Cardiology (ACC/AHA/ESC) Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation conducted a comprehensive review of the relevant literature from 2001 to 2006. Literature searches were conducted in the following databases: PubMed/MEDLINE and the Cochrane Library (including the Cochrane Database of Systematic Reviews and the Cochrane Controlled Trials Registry). Searches focused on English-language sources and studies in human subjects. Articles related to animal experimentation were cited when the information was important to understanding pathophysiological concepts pertinent to patient management and comparable data were not available from human studies. Major search terms included atrial fibrillation, age, atrial remodeling, atrioventricular conduction, atrioventricular node, cardioversion, classification, clinical trial, complications, concealed conduction, cost-effectiveness, defibrillator, demographics, epidemiology, experimental, heart

failure (HF), hemodynamics, human, hyperthyroidism, hypothyroidism, meta-analysis, myocardial infarction, pharmacology, postoperative, pregnancy, pulmonary disease, quality of life, rate control, rhythm control, risks, sinus rhythm, symptoms, and tachycardia-mediated cardiomyopathy.

NUMBER OF SOURCE DOCUMENTS

Not stated

METHODS USED TO ASSESS THE QUALITY AND STRENGTH OF THE EVIDENCE

Weighting According to a Rating Scheme (Scheme Given)

RATING SCHEME FOR THE STRENGTH OF THE EVIDENCE

Levels of Evidence

Level of Evidence A: Data derived from multiple randomized clinical trials or meta-analyses.

Level of Evidence B: Data derived from a single randomized trial, or nonrandomized studies.

Level of Evidence C: Only consensus opinion of experts, case studies, or standard of care.

METHODS USED TO ANALYZE THE EVIDENCE

Review of Published Meta-Analyses
Systematic Review with Evidence Tables

DESCRIPTION OF THE METHODS USED TO ANALYZE THE EVIDENCE

Not stated

METHODS USED TO FORMULATE THE RECOMMENDATIONS

Expert Consensus

DESCRIPTION OF METHODS USED TO FORMULATE THE RECOMMENDATIONS

Experts in the subject under consideration have been selected from the American College of Cardiology, the American Heart Association, and the European Society of Cardiology to examine subject-specific data and write guidelines. The process includes additional representatives from other medical specialty groups when appropriate. Writing committees are specifically charged to perform a formal literature review, weigh the strength of evidence for or against a particular treatment or procedure, and include estimates of expected health outcomes

where data exist. Patient-specific modifiers, comorbidities, and issues of patient preference that might influence the choice of particular tests or therapies are considered as well as frequency of follow-up and cost-effectiveness. When available, information from studies on cost will be considered; however, review of data on efficacy and clinical outcomes will constitute the primary basis for preparing recommendations in these guidelines.

RATING SCHEME FOR THE STRENGTH OF THE RECOMMENDATIONS

Class I: Conditions for which there is evidence and/or general agreement that a given procedure/therapy is beneficial, useful, and effective.

Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of performing the procedure/therapy.

> **Class IIa**: Weight of evidence/opinion is in favor of usefulness/efficacy.
>
> **Class IIb**: Usefulness/efficacy is less well established by evidence/opinion.

Class III: Conditions for which there is evidence and/or general agreement that a procedure/therapy is not useful or effective and in some cases may be harmful.

COST ANALYSIS

Published cost analyses were reviewed.

METHOD OF GUIDELINE VALIDATION

External Peer Review
Internal Peer Review

DESCRIPTION OF METHOD OF GUIDELINE VALIDATION

This document was reviewed by 2 official reviewers nominated by the American College of Cardiology (ACC), 2 official reviewers nominated by the American Heart Association (AHA), and 2 official reviewers nominated by the European Society of Cardiology, as well as by the ACC Foundation Clinical Electrophysiology Committee, the AHA Electrocardiogram (ECG) and Arrhythmias Committee, the AHA Stroke Review Committee, European Heart Rhythm Association (EHRA), Heart Rhythm Society (HRS), and numerous additional content reviewers nominated by the writing committee. The document was approved for publication by the governing bodies of the ACC, AHA, and ESC and officially endorsed by the EHRA and the HRS.

RECOMMENDATIONS

MAJOR RECOMMENDATIONS

Definitions for the weight of the evidence (A-C) and classes of recommendations (I-III) can be found at the end of the "Major Recommendations" field.

Changes Since the Initial Publication of These Guidelines in 2001

In developing this revision of the guidelines, the Writing Committee considered evidence published since 2001 and drafted revised recommendations where appropriate to incorporate results from major clinical trials such as those that compared rhythm-control and rate-control approaches to long-term management. The text has been reorganized to reflect the implications for patient care, beginning with recognition of atrial fibrillation (AF) and its pathogenesis and the general priorities of rate control, prevention of thromboembolism, and methods available for use in selected patients to correct the arrhythmia and maintain normal sinus rhythm. Advances in catheter-based ablation technologies have been incorporated into expanded sections and recommendations, with the recognition that that such vital details as patient selection, optimum catheter positioning, absolute rates of treatment success, and the frequency of complications remain incompletely defined. Sections on drug therapy have been condensed and confined to human studies with compounds that have been approved for clinical use in North America and/or Europe. Accumulating evidence from clinical studies on the emerging role of angiotensin inhibition to reduce the occurrence and complications of AF and information on approaches to the primary prevention of AF are addressed comprehensively in the text, as these may evolve further in the years ahead to form the basis for recommendations affecting patient care. Finally, data on specific aspects of management of patients who are prone to develop AF in special circumstances have become more robust, allowing formulation of recommendations based on a higher level of evidence than in the first edition of these guidelines. An example is the completion of a relatively large randomized trial addressing prophylactic administration of anti-arrhythmic medication for patients undergoing cardiac surgery. In developing the updated recommendations, every effort was made to maintain consistency with other American College of Cardiology/American Heart Association and European Society of Cardiology practice guidelines addressing, for example, the management of patients undergoing myocardial revascularization procedures.

Clinical Evaluation

The initial evaluation of a patient with suspected or proved AF involves characterizing the pattern of the arrhythmia as paroxysmal or persistent, determining its cause, and defining associated cardiac and extracardiac factors pertinent to the etiology, tolerability, and history of prior management (see Table 6 titled "Clinical Evaluation in Patients with AF" in the full text guideline document).

Pharmacological Rate Control During Atrial Fibrillation (AF)

Class I

1. Measurement of the heart rate at rest and control of the rate using pharmacological agents (either a beta blocker or nondihydropyridine calcium channel antagonist, in most cases) are recommended for patients with persistent or permanent AF. *(Level of Evidence: B)*

2. In the absence of preexcitation, intravenous administration of beta blockers (esmolol, metoprolol, or propranolol) or nondihydropyridine calcium channel antagonists (verapamil, diltiazem) is recommended to slow the ventricular response to AF in the acute setting, exercising caution in patients with hypotension or heart failure (HF). *(Level of Evidence: B)*
3. Intravenous administration of digoxin or amiodarone is recommended to control the heart rate in patients with AF and HF who do not have an accessory pathway. *(Level of Evidence: B)*
4. In patients who experience symptoms related to AF during activity, the adequacy of heart rate control should be assessed during exercise, adjusting pharmacological treatment as necessary to keep the rate in the physiological range. *(Level of Evidence: C)*
5. Digoxin is effective following oral administration to control the heart rate at rest in patients with AF and is indicated for patients with HF, left ventricular (LV) dysfunction, or for sedentary individuals. *(Level of Evidence: C)*

Class IIa

1. A combination of digoxin and either a beta blocker or nondihydropyridine calcium channel antagonist is reasonable to control the heart rate both at rest and during exercise in patients with AF. The choice of medication should be individualized and the dose modulated to avoid bradycardia. *(Level of Evidence: B)*
2. It is reasonable to use ablation of the atrioventricular (AV) node or accessory pathway to control heart rate when pharmacological therapy is insufficient or associated with side effects. *(Level of Evidence: B)*
3. Intravenous amiodarone can be useful to control the heart rate in patients with AF when other measures are unsuccessful or contraindicated. *(Level of Evidence: C)*
4. When electrical cardioversion is not necessary in patients with AF and an accessory pathway, intravenous procainamide or ibutilide is a reasonable alternative. *(Level of Evidence: C)*

Class IIb

1. When the ventricular rate cannot be adequately controlled both at rest and during exercise in patients with AF using a beta blocker, nondihydropyridine calcium channel antagonist, or digoxin, alone or in combination, oral amiodarone may be administered to control the heart rate. *(Level of Evidence: C)*
2. Intravenous procainamide, disopyramide, ibutilide, or amiodarone may be considered for hemodynamically stable patients with AF involving conduction over an accessory pathway. *(Level of Evidence: B)*
3. When the rate cannot be controlled with pharmacological agents or tachycardia mediated cardiomyopathy is suspected, catheter-directed ablation of the AV node may be considered in patients with AF to control the heart rate. *(Level of Evidence: C)*

Class III

1. Digitalis should not be used as the sole agent to control the rate of ventricular response in patients with paroxysmal AF. *(Level of Evidence: B)*

2. Catheter ablation of the AV node should not be attempted without a prior trial of medication to control the ventricular rate in patients with AF. *(Level of Evidence: C)*
3. In patients with decompensated HF and AF, intravenous administration of a nondihydropyridine calcium channel antagonist may exacerbate hemodynamic compromise and is not recommended. *(Level of Evidence: C)*
4. Intravenous administration of digitalis glycosides or nondihydropyridine calcium channel antagonists to patients with AF and a preexcitation syndrome may paradoxically accelerate the ventricular response and is not recommended. *(Level of Evidence: C)*

Preventing Thromboembolism

(For recommendations regarding antithrombotic therapy in patients with AF undergoing cardioversion, see Section below titled "Prevention of thromboembolism in patients with atrial fibrillation undergoing cardioversion")

Class I

1. Antithrombotic therapy to prevent thromboembolism is recommended for all patients with AF, except those with lone AF or contraindications. *(Level of Evidence: A)*
2. The selection of the antithrombotic agent should be based upon the absolute risks of stroke and bleeding and the relative risk and benefit for a given patient. *(Level of Evidence: A)*
3. For patients without mechanical heart valves at high risk of stroke, chronic oral anticoagulant therapy with a vitamin K antagonist is recommended in a dose adjusted to achieve the target intensity international normalized ratio (INR) of 2.0 to 3.0, unless contraindicated. Factors associated with highest risk for stroke in patients with AF are prior thromboembolism (stroke, transient ischemic attack [TIA], or systemic embolism) and rheumatic mitral stenosis. *(Level of Evidence: A)*
4. Anticoagulation with a vitamin K antagonist is recommended for patients with more than 1 moderate risk factor. Such factors include age 75 years or greater, hypertension, HF, impaired LV systolic function (ejection fraction 35% or less or fractional shortening less than 25%), and diabetes mellitus. *(Level of Evidence: A)*
5. INR should be determined at least weekly during initiation of therapy and monthly when anticoagulation is stable. *(Level of Evidence: A)*
6. Aspirin, 81 to 325 mg daily, is recommended as an alternative to vitamin K antagonists in low-risk patients or in those with contraindications to oral anticoagulation. *(Level of Evidence: A)*
7. For patients with AF who have mechanical heart valves, the target intensity of anticoagulation should be based on the type of prosthesis, maintaining an INR of at least 2.5. *(Level of Evidence: B)*
8. Antithrombotic therapy is recommended for patients with atrial flutter as for those with AF. *(Level of Evidence: C)*

Class IIa

1. For primary prevention of thromboembolism in patients with nonvalvular AF who have just 1 of the following validated risk factors, antithrombotic therapy

with either aspirin or a vitamin K antagonist is reasonable, based upon an assessment of the risk of bleeding complications, ability to safely sustain adjusted chronic anticoagulation, and patient preferences: age greater than or equal to 75 years (especially in female patients), hypertension, HF, impaired LV function, or diabetes mellitus. *(Level of Evidence: A)*

2. For patients with nonvalvular AF who have 1 or more of the following less well-validated risk factors, antithrombotic therapy with either aspirin or a vitamin K antagonist is reasonable for prevention of thromboembolism: age 65 to 74 years, female gender, or coronary artery disease (CAD). The choice of agent should be based upon the risk of bleeding complications, ability to safely sustain adjusted chronic anticoagulation, and patient preferences. *(Level of Evidence: B)*
3. It is reasonable to select antithrombotic therapy using the same criteria irrespective of the pattern (i.e., paroxysmal, persistent, or permanent) of AF. *(Level of Evidence: B)*
4. In patients with AF who do not have mechanical prosthetic heart valves, it is reasonable to interrupt anticoagulation for up to 1 week without substituting heparin for surgical or diagnostic procedures that carry a risk of bleeding. *(Level of Evidence: C)*
5. It is reasonable to reevaluate the need for anticoagulation at regular intervals. *(Level of Evidence: C)*

Class IIb

1. In patients 75 years of age and older at increased risk of bleeding but without frank contraindications to oral anticoagulant therapy, and in other patients with moderate risk factors for thromboembolism who are unable to safely tolerate anticoagulation at the standard intensity of INR 2.0 to 3.0, a lower INR target of 2.0 (range 1.6 to 2.5) may be considered for primary prevention of ischemic stroke and systemic embolism. *(Level of Evidence: C)*
2. When surgical procedures require interruption of oral anticoagulant therapy for longer than 1 week in high-risk patients, unfractionated heparin may be administered or low-molecular weight heparin given by subcutaneous injection, although the efficacy of these alternatives in this situation is uncertain. *(Level of Evidence: C)*
3. Following percutaneous coronary intervention or revascularization surgery in patients with AF, low-dose aspirin (less than 100 mg per day) and/or clopidogrel (75 mg per day) may be given concurrently with anticoagulation to prevent myocardial ischemic events, but these strategies have not been thoroughly evaluated and are associated with an increased risk of bleeding. *(Level of Evidence: C)*
4. In patients undergoing percutaneous coronary intervention, anticoagulation may be interrupted to prevent bleeding at the site of peripheral arterial puncture, but the vitamin K antagonist should be resumed as soon as possible after the procedure and the dose adjusted to achieve an INR in the therapeutic range. Aspirin may be given temporarily during the hiatus, but the maintenance regimen should then consist of the combination of clopidogrel, 75 mg daily, plus warfarin (INR 2.0 to 3.0). Clopidogrel should be given for a minimum of 1 month after implantation of a bare metal stent, at least 3 months for a sirolimus-eluting stent, at least 6 months for a paclitaxel-eluting stent, and 12 months or longer in selected patients, following which warfarin may be continued as monotherapy in the absence of a subsequent

coronary event. When warfarin is given in combination with clopidogrel or low-dose aspirin, the dose intensity must be carefully regulated. *(Level of Evidence: C)*

5. In patients with AF younger than 60 years without heart disease or risk factors for thromboembolism (lone AF), the risk of thromboembolism is low without treatment and the effectiveness of aspirin for primary prevention of stroke relative to the risk of bleeding has not been established. *(Level of Evidence: C)*
6. In patients with AF who sustain ischemic stroke or systemic embolism during treatment with low intensity anticoagulation (INR 2.0 to 3.0), rather than add an antiplatelet agent, it may be reasonable to raise the intensity of the anticoagulation to a maximum target INR of 3.0 to 3.5. *(Level of Evidence: C)*

Class III

Long-term anticoagulation with a vitamin K antagonist is not recommended for primary prevention of stroke in patients below the age of 60 years without heart disease (lone AF) or any risk factors for thromboembolism. *(Level of Evidence: C)*

Cardioversion of Atrial Fibrillation

Pharmacological Cardioversion of Atrial Fibrillation

Class I

Administration of flecainide, dofetilide, propafenone, or ibutilide is recommended for pharmacological cardioversion of AF. *(Level of Evidence: A)*

Class IIa

1. Administration of amiodarone is a reasonable option for pharmacological cardioversion of AF. *(Level of Evidence: A)*
2. A single oral bolus dose of propafenone or flecainide ("pill-in-the-pocket") can be administered to terminate persistent AF outside the hospital once treatment has proved safe in hospital for selected patients without sinus or AV node dysfunction, bundle-branch block, QT-interval prolongation, the Brugada syndrome, or structural heart disease. Before antiarrhythmic medication is initiated, a beta blocker or nondihydropyridine calcium channel antagonist should be given to prevent rapid AV conduction in the event atrial flutter occurs. *(Level of Evidence: C)*
3. Administration of amiodarone can be beneficial on an outpatient basis in patients with paroxysmal or persistent AF when rapid restoration of sinus rhythm is not deemed necessary. *(Level of Evidence: C)*

Class IIb

Administration of quinidine or procainamide might be considered for pharmacological cardioversion of AF, but the usefulness of these agents is not well established. *(Level of Evidence: C)*

Class III

1. Digoxin and sotalol may be harmful when used for pharmacological cardioversion of AF and are not recommended. *(Level of Evidence: A)*
2. Quinidine, procainamide, disopyramide, and dofetilide should not be started out of hospital for conversion of AF to sinus rhythm. *(Level of Evidence: B)*

Direct-Current Cardioversion of Atrial Fibrillation and Flutter

Class I

1. When a rapid ventricular response does not respond promptly to pharmacological measures for patients with AF with ongoing myocardial ischemia, symptomatic hypotension, angina, or heart failure (HF), immediate R-wave synchronized direct-current cardioversion is recommended. *(Level of Evidence: C)*
2. Immediate direct-current cardioversion is recommended for patients with AF involving preexcitation when very rapid tachycardia or hemodynamic instability occurs. *(Level of Evidence: B)*
3. Cardioversion is recommended in patients without hemodynamic instability when symptoms of AF are unacceptable to the patient. In case of early relapse of AF after cardioversion, repeated direct-current cardioversion attempts may be made following administration of antiarrhythmic medication. *(Level of Evidence: C)*

Class IIa

1. Direct-current cardioversion can be useful to restore sinus rhythm as part of a long-term management strategy for patients with AF. *(Level of Evidence: B)*
2. Patient preference is a reasonable consideration in the selection of infrequently repeated cardioversions for the management of symptomatic or recurrent AF. *(Level of Evidence: C)*

Class III

1. Frequent repetition of direct-current cardioversion is not recommended for patients who have relatively short periods of sinus rhythm between relapses of AF after multiple cardioversion procedures despite prophylactic antiarrhythmic drug therapy. *(Level of Evidence: C)*
2. Electrical cardioversion is contraindicated in patients with digitalis toxicity or hypokalemia. *(Level of Evidence: C)*

Pharmacological Enhancement of Direct-Current Cardioversion

Class IIa

1. Pretreatment with amiodarone, flecainide, ibutilide, propafenone, or sotalol can be useful to enhance the success of direct-current cardioversion and prevent recurrent AF. *(Level of Evidence: B)*
2. In patients who relapse to AF after successful cardioversion, it can be useful to repeat the procedure following prophylactic administration of antiarrhythmic medication. *(Level of Evidence: C)*

Class IIb

1. For patients with persistent AF, administration of beta blockers, disopyramide, diltiazem, dofetilide, procainamide, or verapamil may be considered, although the efficacy of these agents to enhance the success of direct-current cardioversion or to prevent early recurrence of AF is uncertain. *(Level of Evidence: C)*
2. Out-of-hospital initiation of antiarrhythmic medications may be considered in patients without heart disease to enhance the success of cardioversion of AF. *(Level of Evidence: C)*
3. Out-of-hospital administration of antiarrhythmic medications may be considered to enhance the success of cardioversion of AF in patients with certain forms of heart disease once the safety of the drug has been verified for the patient. *(Level of Evidence: C)*

Prevention of Thromboembolism in Patients With Atrial Fibrillation Undergoing Cardioversion

Class I

1. For patients with AF of 48-hour duration or longer, or when the duration of AF is unknown, anticoagulation (INR 2.0 to 3.0) is recommended for at least 3 wk prior to and 4 wk after cardioversion, regardless of the method (electrical or pharmacological) used to restore sinus rhythm. *(Level of Evidence: B)*
2. For patients with AF of more than 48-hour duration requiring immediate cardioversion because of hemodynamic instability, heparin should be administered concurrently (unless contraindicated) by an initial intravenous bolus injection followed by a continuous infusion in a dose adjusted to prolong the activated partial thromboplastin time to 1.5 to 2 times the reference control value. Thereafter, oral anticoagulation (INR 2.0 to 3.0) should be provided for at least 4 weeks, as for patients undergoing elective cardioversion. Limited data support subcutaneous administration of low-molecular-weight heparin in this indication. *(Level of Evidence: C)*
3. For patients with AF of less than 48-hours duration associated with hemodynamic instability (angina pectoris, myocardial infarction [MI], shock, or pulmonary edema), cardioversion should be performed immediately without delay for prior initiation of anticoagulation. *(Level of Evidence: C)*

Class IIa

1. During the 48 hours after onset of AF, the need for anticoagulation before and after cardioversion may be based on the patient's risk of thromboembolism. *(Level of Evidence: C)*
2. As an alternative to anticoagulation prior to cardioversion of AF, it is reasonable to perform transesophageal echocardiography (TEE) in search of thrombus in the left atrium (LA) or left atrial appendage (LAA). *(Level of Evidence: B)*
    a. For patients with no identifiable thrombus, cardioversion is reasonable immediately after anticoagulation with unfractionated heparin (e.g., initiate by intravenous bolus injection and an infusion continued at a dose adjusted to prolong the activated partial thromboplastin time to 1.5 to 2 times the control value until oral anticoagulation has been

established with vitamin K antagonist (e.g., warfarin) as evidenced by an INR equal to or greater than 2.0). *(Level of Evidence: B)*

Thereafter, oral anticoagulation (INR 2.0 to 3.0) is reasonable for a total anticoagulation period of at least 4 weeks, as for patients undergoing elective cardioversion. *(Level of Evidence: B)*

Limited data are available to support the subcutaneous administration of a low molecular-weight heparin in this indication. *(Level of Evidence: C)*

b. For patients in whom thrombus is identified by TEE, oral anticoagulation (INR 2.0 to 3.0) is reasonable for at least 3 weeks prior to and 4 weeks after restoration of sinus rhythm, and a longer period of anticoagulation may be appropriate even after apparently successful cardioversion, because the risk of thromboembolism often remains elevated in such cases. *(Level of Evidence: C)*

3. For patients with atrial flutter undergoing cardioversion, anticoagulation can be beneficial according to the recommendations as for patients with AF. *(Level of Evidence: C)*

Maintenance of Sinus Rhythm

Class I

Before initiating antiarrhythmic drug therapy, treatment of precipitating or reversible causes of AF is recommended. *(Level of Evidence: C)*

Class IIa

1. Pharmacological therapy can be useful in patients with AF to maintain sinus rhythm and prevent tachycardia-induced cardiomyopathy. *(Level of Evidence: C)*
2. Infrequent, well-tolerated recurrence of AF is reasonable as a successful outcome of antiarrhythmic drug therapy. *(Level of Evidence: C)*
3. Outpatient initiation of antiarrhythmic drug therapy is reasonable in patients with AF who have no associated heart disease when the agent is well tolerated. *(Level of Evidence: C)*
4. In patients with lone AF without structural heart disease, initiation of propafenone or flecainide can be beneficial on an outpatient basis in patients with paroxysmal AF who are in sinus rhythm at the time of drug initiation. *(Level of Evidence: B)*
5. Sotalol can be beneficial in outpatients in sinus rhythm with little or no heart disease, prone to paroxysmal AF, if the baseline uncorrected QT interval is less than 460 ms, serum electrolytes are normal, and risk factors associated with class III drug–related proarrhythmia are not present. *(Level of Evidence: C)*
6. Catheter ablation is a reasonable alternative to pharmacological therapy to prevent recurrent AF in symptomatic patients with little or no LA enlargement. *(Level of Evidence: C)*

Class III

1. Antiarrhythmic therapy with a particular drug is not recommended for maintenance of sinus rhythm in patients with AF who have well defined risk factors for proarrhythmia with that agent. *(Level of Evidence: A)*
2. Pharmacological therapy is not recommended for maintenance of sinus rhythm in patients with advanced sinus node disease or atrioventricular (AV) node dysfunction unless they have a functioning electronic cardiac pacemaker. *(Level of Evidence: C)*

Special Considerations

Postoperative Atrial Fibrillation

Class I

1. Unless contraindicated, treatment with an oral beta blocker to prevent postoperative AF is recommended for patients undergoing cardiac surgery. *(Level of Evidence: A)*
2. Administration of AV nodal blocking agents is recommended to achieve rate control in patients who develop postoperative AF. *(Level of Evidence: B)*

Class IIa

1. Preoperative administration of amiodarone reduces the incidence of AF in patients undergoing cardiac surgery and represents appropriate prophylactic therapy for patients at high risk for postoperative AF. *(Level of Evidence: A)*
2. It is reasonable to restore sinus rhythm by pharmacological cardioversion with ibutilide or direct-current cardioversion in patients who develop postoperative AF as advised for nonsurgical patients. *(Level of Evidence: B)*
3. It is reasonable to administer antiarrhythmic medications in an attempt to maintain sinus rhythm in patients with recurrent or refractory postoperative AF, as recommended for other patients who develop AF. *(Level of Evidence: B)*
4. It is reasonable to administer antithrombotic medication in patients who develop postoperative AF, as recommended for nonsurgical patients. *(Level of Evidence: B)*

Class IIb

Prophylactic administration of sotalol may be considered for patients at risk of developing AF following cardiac surgery. *(Level of Evidence: B)*

Acute Myocardial Infarction (MI)

Class I

1. Direct-current cardioversion is recommended for patients with severe hemodynamic compromise or intractable ischemia, or when adequate rate control cannot be achieved with pharmacological agents in patients with acute MI and AF. *(Level of Evidence: C)*

2. Intravenous administration of amiodarone is recommended to slow a rapid ventricular response to AF and improve LV function in patients with acute MI. *(Level of Evidence: C)*
3. Intravenous beta blockers and nondihydropyridine calcium antagonists are recommended to slow a rapid ventricular response to AF in patients with acute MI who do not display clinical LV dysfunction, bronchospasm, or AV block. *(Level of Evidence: C)*
4. For patients with AF and acute MI, administration of unfractionated heparin by either continuous intravenous infusion or intermittent subcutaneous injection is recommended in a dose sufficient to prolong the activated partial thromboplastin time to 1.5 to 2 times the control value, unless contraindications to anticoagulation exist. *(Level of Evidence: C)*

Class IIa

Intravenous administration of digitalis is reasonable to slow a rapid ventricular response and improve LV function in patients with acute MI and AF associated with severe LV dysfunction and HF. *(Level of Evidence: C)*

Class III

The administration of class IC antiarrhythmic drugs is not recommended in patients with AF in the setting of acute MI. *(Level of Evidence: C)*

Management of Atrial Fibrillation Associated With the Wolff-Parkinson-White (WPW) Preexcitation Syndrome

Class I

1. Catheter ablation of the accessory pathway is recommended in symptomatic patients with AF who have WPW syndrome, particularly those with syncope due to rapid heart rate or those with a short bypass tract refractory period. *(Level of Evidence: B)*
2. Immediate direct-current cardioversion is recommended to prevent ventricular fibrillation in patients with a short anterograde bypass tract refractory period in whom AF occurs with a rapid ventricular response associated with hemodynamic instability. *(Level of Evidence: B)*
3. Intravenous procainamide or ibutilide is recommended to restore sinus rhythm in patients with WPW in whom AF occurs without hemodynamic instability in association with a wide QRS complex on the electrocardiogram (ECG) (greater than or equal to 120-ms duration) or with a rapid preexcited ventricular response. *(Level of Evidence: C)*

Class IIa

Intravenous flecainide or direct-current cardioversion is reasonable when very rapid ventricular rates occur in patients with AF involving conduction over an accessory pathway. *(Level of Evidence: B)*

Class IIb

It may be reasonable to administer intravenous quinidine, procainamide, disopyramide, ibutilide, or amiodarone to hemodynamically stable patients with AF involving conduction over an accessory pathway. *(Level of Evidence: B)*

Class III

Intravenous administration of digitalis glycosides or nondihydropyridine calcium channel antagonists is not recommended in patients with WPW syndrome who have preexcited ventricular activation during AF. *(Level of Evidence: B)*

Hyperthyroidism

Class I

1. Administration of a beta blocker is recommended to control the rate of ventricular response in patients with AF complicating thyrotoxicosis, unless contraindicated. *(Level of Evidence: B)*
2. In circumstances when a beta blocker cannot be used, administration of a nondihydropyridine calcium channel antagonist (diltiazem or verapamil) is recommended to control the ventricular rate in patients with AF and thyrotoxicosis. *(Level of Evidence: B)*
3. In patients with AF associated with thyrotoxicosis, oral anticoagulation (INR 2.0 to 3.0) is recommended to prevent thromboembolism, as recommended for AF patients with other risk factors for stroke. *(Level of Evidence: C)*
4. Once a euthyroid state is restored, recommendations for antithrombotic prophylaxis are the same as for patients without hyperthyroidism. *(Level of Evidence: C)*

Management of Atrial Fibrillation During Pregnancy

Class I

1. Digoxin, a beta blocker, or a nondihydropyridine calcium channel antagonist is recommended to control the rate of ventricular response in pregnant patients with AF. *(Level of Evidence: C)*
2. Direct-current cardioversion is recommended in pregnant patients who become hemodynamically unstable due to AF. *(Level of Evidence: C)*
3. Protection against thromboembolism is recommended throughout pregnancy for all patients with AF (except those with lone AF and/or low thromboembolic risk). Therapy (anticoagulant or aspirin) should be chosen according to the stage of pregnancy. *(Level of Evidence: C)*

Class IIb

1. Administration of heparin may be considered during the first trimester and last month of pregnancy for patients with AF and risk factors for thromboembolism. Unfractionated heparin may be administered either by continuous intravenous infusion in a dose sufficient to prolong the activated partial thromboplastin time to 1.5 to 2 times the control value or by intermittent subcutaneous injection in a dose of 10,000 to 20,000 units every 12 hours, adjusted to prolong the mid-interval (6 hours after injection)

activated partial thromboplastin time to 1.5 times control. *(Level of Evidence: B)*
2. Despite the limited data available, subcutaneous administration of low-molecular weight heparin may be considered during the first trimester and last month of pregnancy for patients with AF and risk factors for thromboembolism. *(Level of Evidence: C)*
3. Administration of an oral anticoagulant may be considered during the second trimester for pregnant patients with AF at high thromboembolic risk. *(Level of Evidence: C)*
4. Administration of quinidine or procainamide may be considered to achieve pharmacological cardioversion in hemodynamically stable patients who develop AF during pregnancy. *(Level of Evidence: C)*

Management of Atrial Fibrillation in Patients With Hypertrophic Cardiomyopathy (HCM)

Class I

Oral anticoagulation (INR 2.0 to 3.0) is recommended in patients with HCM who develop AF, as for other patients at high risk of thromboembolism. *(Level of Evidence: B)*

Class IIa

Antiarrhythmic medications can be useful to prevent recurrent AF in patients with HCM. Available data are insufficient to recommend one agent over another in this situation, but (a) disopyramide combined with a beta blocker or nondihydropyridine calcium channel antagonist or (b) amiodarone alone is generally preferred. *(Level of Evidence: C)*

Management of Atrial Fibrillation in Patients With Pulmonary Disease

Class I

1. Correction of hypoxemia and acidosis is the recommended primary therapeutic measure for patients who develop AF during an acute pulmonary illness or exacerbation of chronic pulmonary disease. *(Level of Evidence: C)*
2. A nondihydropyridine calcium channel antagonist (diltiazem or verapamil) is recommended to control the ventricular rate in patients with obstructive pulmonary disease who develop AF. *(Level of Evidence: C)*
3. Direct-current cardioversion should be attempted in patients with pulmonary disease who become hemodynamically unstable as a consequence of AF. *(Level of Evidence: C)*

Class III

1. Theophylline and beta-adrenergic agonist agents are not recommended in patients with bronchospastic lung disease who develop AF. *(Level of Evidence: C)*
2. Beta blockers, sotalol, propafenone, and adenosine are not recommended in patients with obstructive lung disease who develop AF. *(Level of Evidence: C)*

Definitions:

Classification of Recommendations

Class I: Conditions for which there is evidence and/or general agreement that a given procedure/therapy is beneficial, useful, and effective.

Class II: Conditions for which there is conflicting evidence and/or a divergence of opinion about the usefulness/efficacy of a procedure/therapy.

> **Class IIa**: Weight of evidence/opinion is in favor of usefulness/efficacy.
>
> **Class IIb**: Usefulness/efficacy is less well established by evidence/opinion.

Class III: Conditions for which there is evidence and/or general agreement that a procedure/therapy is not useful/effective and in some cases may be harmful.

Levels of Evidence

A: Data derived from multiple randomized clinical trials or meta-analyses

B: Data derived from a single randomized trial, or nonrandomized studies

C: Only consensus opinion of experts, case studies, or standard-of-care

CLINICAL ALGORITHM(S)

Four clinical algorithms are provided in the original guideline document:

- Pharmacological Management of Patients with Newly Discovered Atrial Fibrillation
- Pharmacological Management of Patients with Recurrent Paroxysmal Atrial Fibrillation
- Antiarrhythmic Drug Therapy to Maintain Sinus Rhythm in Patients with Recurrent Paroxysmal or Persistent Atrial Fibrillation
- Pharmacological Management of Patients with Recurrent Persistent or Permanent Atrial Fibrillation

EVIDENCE SUPPORTING THE RECOMMENDATIONS

TYPE OF EVIDENCE SUPPORTING THE RECOMMENDATIONS

The recommendations are evidence based and derived primarily from published data. The weight of evidence is given for each recommendation (see the "Major Recommendations" field).

BENEFITS/HARMS OF IMPLEMENTING THE GUIDELINE RECOMMENDATIONS

POTENTIAL BENEFITS

Appropriate management of patients with atrial fibrillation

POTENTIAL HARMS

Pharmacological Rate Control

For major side effects of intravenous and orally administered pharmacological agents for heart rate control in patients with atrial fibrillation (AF) in the acute settings and non-acute settings/chronic maintenance therapy, see Table 10 in the original guideline document.

Pharmacologic Cardioversion

- The major risk is related to the toxicity of antiarrhythmic drugs.
- For potential adverse effects of drugs proven effective for pharmacological cardioversion of AF, see Table 18 in the original guideline document

Electrical Cardioversion

- The risks of direct-current cardioversion are mainly related to thromboembolism and arrhythmias. See section 8.2.5 in the original guideline document for a discussion of risks and complications of direct-current cardioversion of AF.
- Stroke or systemic embolism has been reported in patients with atrial flutter undergoing cardioversion.

Atrioventricular (AV) Nodal Ablation

- Complications of catheter ablation include the adverse events associated with any cardiac catheterization procedure in addition to those specific to ablation of AF. See Section 8.3.4.2.1 for complications of catheter-based ablation.
- Cather ablation has several limitations, including the inadvertent complete AV block and a tendency of ventricular rate to rise over the 6 months following ablation.
- Complications of AV nodal ablation include those associated with pacemaker implantation, ventricular arrhythmias, thromboembolism associated with interruption of anticoagulation, the rare occurrence of left ventricular (LV) dysfunction, progression from paroxysmal to persistent AF. The 1-year mortality rate after AV nodal ablation and permanent pacemaker implantation is approximately 6.3%, including a 2.0% risk of sudden death.
- Limitations of this technique include the persistent need for anticoagulation, loss of AV synchrony, and lifelong pacemaker dependency. There is also a finite risk of sudden death due to torsades de pointes or ventricular fibrillation. Patients with abnormalities of diastolic ventricular compliance who depend on AV synchrony to maintain cardiac output, such as those with hypertrophic cardiomyopathy or hypertensive heart disease, may experience persistent symptoms after AV nodal ablation and pacemaker implantation.

Right Ventricular (RV) Pacing

The adverse hemodynamic effects of RV apical pacing following AV nodal ablation have been a source of concern. Compared with RV apical pacing, LV pacing significantly improves indices of both LV systolic function (pressure volume loop, stroke work, ejection fraction, and dP/dt) and diastolic filling.

Anticoagulation

- Bleeding
- Anticoagulation increases the frequency and severity of major extracranial and intracranial hemorrhage.

CONTRAINDICATIONS

CONTRAINDICATIONS

- Intravenous administration of drugs such as digitalis, verapamil, or diltiazem, which lengthen refractoriness and slow conduction across the atrioventricular (AV) node, does not block conduction over the accessory pathway and may accelerate the ventricular rate. Hence, these agents are contraindicated in patients with preexcitation syndromes.
- Intravenous beta blockers, digitalis, adenosine, lidocaine, and nondihydropyridine calcium channel antagonists, all of which slow conduction across the AV node, are contraindicated in patients with the Wolff-Parkinson White syndrome and tachycardia associated with ventricular preexcitation, because they can facilitate antegrade conduction along the accessory pathway during atrial fibrillation (AF), resulting in acceleration of the ventricular rate, hypotension, or ventricular fibrillation.
- Administration of AV nodal blocking agents such as digoxin, diltiazem, or verapamil is contraindicated in a patient with a preexcited tachycardia.
- Beta blockers, sotalol, propafenone, and adenosine are contraindicated in patients with bronchospasm.
- Propafenone should be used cautiously or not at all for conversion of AF in patients with organic heart disease and should be avoided in patients with heart failure (HF) or severe obstructive lung disease
- Detection of left atrial/left atrial appendage thrombus stands as a contraindication to elective cardioversion of AF.
- Electrical cardioversion is contraindicated in patients with digitalis toxicity or hypokalemia.

QUALIFYING STATEMENTS

QUALIFYING STATEMENTS

- These practice guidelines are intended to assist healthcare providers in clinical decision making by describing a range of generally acceptable approaches for the diagnosis, management, and prevention of specific diseases and conditions. These guidelines attempt to define practices that meet the needs of most patients in most circumstances. These guideline recommendations reflect a consensus of expert opinion after a thorough review of the available,

current scientific evidence and are intended to improve patient care. If these guidelines are used as the basis for regulatory/payer decisions, the ultimate goal is quality of care and serving the patient's best interests. The ultimate judgment regarding care of a particular patient must be made by the healthcare provider and the patient in light of all of the circumstances presented by that patient. There are circumstances in which deviations from these guidelines are appropriate.

- Because atrial flutter can precede or coexist with atrial fibrillation (AF), special consideration is given to this arrhythmia in each section. There are important differences in the mechanisms of AF and atrial flutter, and the body of evidence available to support therapeutic recommendations is distinct for the 2 arrhythmias. Atrial flutter is not addressed comprehensively in these guidelines but is addressed in the American College of Cardiology/American Heart Association/European Society of Cardiology Guidelines on the Management of Patients with Supraventricular Arrhythmias.
- The antiarrhythmic drugs listed have been approved by federal regulatory agencies in the United States and/or Europe for clinical use, but their use for the treatment of AF has not been approved in all cases. Furthermore, not all agents are approved for use in all countries. The recommendations given in this document are based on published data and do not necessarily adhere to the regulations and labeling requirements of government agencies.

IMPLEMENTATION OF THE GUIDELINE

DESCRIPTION OF IMPLEMENTATION STRATEGY

An implementation strategy was not provided.

IMPLEMENTATION TOOLS

Clinical Algorithm
Personal Digital Assistant (PDA) Downloads
Pocket Guide/Reference Cards
Slide Presentation

For information about availability, see the "Availability of Companion Documents" and "Patient Resources" fields below.

INSTITUTE OF MEDICINE (IOM) NATIONAL HEALTHCARE QUALITY REPORT CATEGORIES

IOM CARE NEED

Living with Illness

IOM DOMAIN

Effectiveness

IDENTIFYING INFORMATION AND AVAILABILITY

BIBLIOGRAPHIC SOURCE(S)

European Heart Rhythm Association, Heart Rhythm Society, Zipes DP, Camm AJ, Borggrefe M, Buxton AE, Chaitman B, Fromer M, Gregoratos G, Klein G, Moss AJ, Myerburg RJ, Priori SG, Quinones MA, Roden DM, Silka MJ, Tracy C, Smith SC Jr, Jacobs AK, Adams CD, Antman EM, Anderson JL, Hunt SA, Halperin JL, Nishimura R, Ornato JP, Page RL, Riegel B, Priori SG, Blanc JJ, Budaj A, Camm AJ, Dean V, Deckers JW, Despres C, Dickstein K, Lekakis J, McGregor K, Metra M, Morais J, Osterspey A, Tamargo JL, Zamorano JL, American College of Cardiology, American Heart Association Task Force, European Society of Cardiology Committee for Practice Guidelines. ACC/AHA/ESC 2006 guidelines for management of patients with ventricular arrhythmias and the prevention of sudden cardiac death: a report of the American College of Cardiology/American Heart Association Task Force and the European Society [trunc]. J Am Coll Cardiol 2006 Sep 5;48(5):e247-346. [1085 references] PubMed

ADAPTATION

Not applicable: The guideline was not adapted from another source.

DATE RELEASED

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GUIDELINE DEVELOPER(S)

American College of Cardiology Foundation - Medical Specialty Society
American Heart Association - Professional Association
European Society of Cardiology - Medical Specialty Society

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GUIDELINE COMMITTEE

American College of Cardiology/American Heart Association Task Force on Practice Guidelines

European Society of Cardiology Committee for Practice Guidelines

Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation

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FINANCIAL DISCLOSURES/CONFLICTS OF INTEREST

The ACC/AHA Task Force on Practice Guidelines and the ESC Committee for Practice Guidelines make every effort to avoid any actual, potential, or perceived conflict of interest that might arise as a result of an outside relationship or personal interest of the writing committee. Specifically, all members of the Writing Committee and peer reviewers of the document are asked to provide disclosure statements of all such relationships that might be perceived as real or potential conflicts of interest. Writing committee members are also strongly encouraged to declare a previous relationship with industry that might be perceived as relevant to guideline development. If a writing committee member develops a new relationship with industry during their tenure, they are required to notify guideline staff in writing. The continued participation of the writing committee member will be reviewed. These statements are reviewed by the parent Task Force, reported orally to all members of the writing committee at each meeting, and updated and reviewed by the writing committee as changes occur.

See Appendices 1 and 2 of the original full-text guideline document for author relationships with industry and peer reviewer relationships with industry that are pertinent to these guidelines.

ENDORSER(S)

European Heart Rhythm Association - Professional Association
Heart Rhythm Society - Professional Association

GUIDELINE STATUS

This is the current release of the guideline.

This guideline updates a previous version: American College of Cardiology, American Heart Association, European Society of Cardiology. ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation. J Am Coll Cardiol 2001 Oct;38:1266i-lxx.

Fuster V, Ryden LE, Asinger RW, Cannom DS, Crijns HJ, Frye RL, Halperin JL, Kay GN, Klein WW, Levy S, McNamara RL, Prystowsky EN, Wann LS, Wyse DG. ACC/AHA/ESC guidelines for the management of patients with atrial fibrillation. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the ESC Committee for Practice Guidelines and Policy [trunc]. Eur Heart J 2001 Oct;22(20):1852-923.

GUIDELINE AVAILABILITY

Electronic copies: Available in Portable Document Format (PDF) from the American College of Cardiology (ACC) Web site.

Copies are also available from the American Heart Association (AHA) Web site, and the European Society of Cardiology (ESC) Web site.

Print copies: Available from the American College of Cardiology, Resource Center, 9111 Old Georgetown Rd, Bethesda, MD 20814-1699; (800) 253-4636 (US only).

AVAILABILITY OF COMPANION DOCUMENTS

The following are available:

- ACC/AHA/ESC 2006 guidelines for the management of patients with atrial fibrillation - executive summary. A report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines and the European Society of Cardiology Committee for Practice Guidelines (Writing Committee to Revise the 2001 Guidelines for the Management of Patients With Atrial Fibrillation). J Am Coll Cardiol 2006 Aug;48(4):854-906. Electronic copies: Available from the American College of Cardiology (ACC) Web site. Also available in PDF from the American Heart Association (AHA) Web site, and the European Society of Cardiology (ESC) Web site.

- ACC/AHA/ESC pocket guidelines for atrial fibrillation. Electronic copies: Available from the ESC Web site. Also available for PDA download from the ESC Web site.
- ESC slide set for atrial fibrillation. Electronic copies: Available from the ESC Web site.

Print copies: Available from the American College of Cardiology, Resource Center, 9111 Old Georgetown Rd, Bethesda, MD 20814-1699; (800) 253-4636 (US only). Also available from AHA, Public Information, 7272 Greenville Ave, Dallas, TX 75231-4596: Reprint No. 71-0208. ESC versions available from the Oxford University Press (OUP), Great Clarendon Street, Oxford OX2 6DP, England; Tel: +44(0) 1865 353907, Fax: +44(0) 1865 353485.

PATIENT RESOURCES

None available

NGC STATUS

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